AN IMPLEMENTATION APPROACH TO THE DETECTION OF FAULTS IN THE FABRICS WITH THE HELP OF IMAGE PROCESSING TECHNIQUES

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ABSTRACT

The Purpose in the publication of this paper is to keenly find out the defects in the fabrics. Mainly the system should be implemented in the production and manufacturing companies, where the actual handling of the clothes and fabrics is done. Classification of the fabrics with defects is an important task and that to with the help of the system because the human labor though very keen can because the errors up to one percent that remains unattended or unseen by the human vision. Hence the need in development of the system arises that will certainly overcome the errors caused by the laborers. Therefore coming forward and constructing such system by taking the help of image processing techniques that includes the serial wise creating the threshold value.

KEYWORDS: Defects, Threshold, Classification, Errors

INTRODUCTION

India being a developing country, each and every production produced from it should be of high in quality and quantity as well. Quantity if discussed can be as high as one wants, question arises can we have quantity along with the quality. India is a huge manufacturer of the fabrics that is the textiles, out of which the major share of it is being exported to the rest of the world.

Keeping in to view all this aspects fabrics manufacturing unit in India should implement such a system that will give the best out of it to the world. Best here implies only to the quality that should be best than the other manufacturers. Textile industry uses two terms, namely its quality and the defects. Quality is the term used for the good behavior of the textiles that refers to the proper texture, properly used raw materials, proper finishing to the fabrics and the most important the process used in the textile yarning. The flow of the system goes exactly the way designed according to the requirements than there will be no compromise in the quality, if failed it is to be considered as a scrap or of any other use. The second scenario described gives birth to the defect. A defect in the textile leads to the rejection of the same. Improper input either the raw materials or the other leads to the defect in the fabrics, improper performance of the human labor.[2]

Hence we develop a system that will minimize the defects occurring in textile by observing and inspecting the fabrics at the inspection stage and thus concluding in the acceptance and the rejection of the fabrics for the manufacturing unit, that will certainly give a better rise in the high quality export and the fame in international market.

For developing this system image processing is the best option so that images can be easily get captured and processed using the various components and the functions of the technique. Combination of various algorithms together comprises the digital image processing techniques that we are going to use in the system. It also proves to be efficient than the traditional analog method of image processing the reason behind is that the image that is used as the input can be processed further with the various in built programs and algorithm as well. Also other reason being the reduction of the noise and the distortion caused

SURVEY

Image processing mainly plays with the images. Image being a quantity that is defined on the two dimensions, the system developed is a multidimensional system that uses the threshold value and the image is given as the raw material to the system which further with the help of image processing technique gets hit by a sequence of operations that will generate the threshold value. The system also generates the overall threshold value of the system. Thresholding is the key aspect of the system and all the conclusions drawn are based on the thresholding output.[1]

As of today the system was based on the manual human work that is very time-consuming also require a lot of hard work. In addition there is no assurance of the work to be done o time and the quality of the work. Moreover highly skilled and more experienced staff in the domain is to be hired selection of which is lengthy process. Later some research was done on the same and implementation was done using neural network, microcontroller, etc. Our concentration is to develop a medium that will distinguish the defect from the original system and with the total value of the defect that is present.

The system developed is expected to run according to the user and should be user friendly so that ongoing process should not be stopped if any other is handling it.Design of the process is done in such a way that it should be able to give as the output the processed fabrics that show as a defect free sample. This will certainly make a hike in the production and overall manufacturing. The image given as input is converting to the gray scale image and then passing through the gray conversion followed by its binary equivalent. This binary equivalent image obtained is ready for processing that will generate the threshold value. Analysis of such value is done and processed for the defect detection.[5]

Thresholding is the main aspect that is been playing the important role in the system. It is the key that is used for the processing of the fault detection. Threshold value should be taken for all the patternsin the input, it will be the benchmark and the other values will be compared, if all the values are equal then there is no defect in the system. In converse if any of the value is less than the threshold value than it is the defect in the sample. [3]

The main motto behind building this system is to properly pointing out the defect in the textile and immediately giving an alarm to the user implying that there is the defect at one particular location and giving the exact location of the defect thus reducing the time of the production and giving a big rise in the same. System not only will help in finding the defect but it will also be able to find out the exact location of the defect occurred and the system will intimate the user that there is a defect and it is at one particular location.

ALGORITHM

Pattern matching is the algorithm that is used in developing the system in which the one pattern is decided in the particular sample and that is the template that will be used for the algorithm for matching. Preceding the selection of thetemplate, the same is thenloaded in to the system and the sample that is to be examined. The system then matches the

template to each and every part of the sample and simultaneously generates the threshold value for each part. Then after generation of all the threshold value the conclusion is done accordingly. If all the values are same it concludes no defect, whereas if any value is different then there is a defect at that particular location and intimate the location of the defect.[4]

In addition to the pattern matching algorithm the background of image training is also necessary. Image training refers to teaching the template to match each and every part of the other image that we refer here as a sample. Then the template matches itself to the sample according to the design and if it matches it gives ok and if not defect is pointed out.

DESIGN AND IMPLEMENTATION

Developed system can be viewed as the parallel running process of the system consisting of the process of converting and the process of generating. Process of converting involves conversion to gray image and that is further transferred in to the binary equivalent image. While generation is the generation of the template from the sample and then generation of the threshold value.

Figure 1 shows the detailed design of the system that can be explained as follows

Input: -The textile samples are taken in the form of the images turn by turn for the inspection of any defects. The fabrics are in the form of images that are either in the form of jpeg or gif format. The input set here is the camera for capturing the images of the fabrics. Acquiring of the images is done and analyzed according the camera components that is the pixel value of the camera. There might be possibility of the image containing the noise; in such cases removal is necessary of the noise.

Conversions: -The image that is taken as the input is not ready for processing hence it is necessary that the image should be converted. Conversion phase is the phase that mainly involves converting the raw input image in to the gray scale image. Binary image is obtained y the conversion from the gray scale image, since the machine can read only the binary form of the image.

Template Creation: - A template is generated from the analysis of the sample. It is been done by properly surveying the sample and finding out the most common pattern probably that is been repeated a number of times. User can select or generate the template accordingly as per the request or the ease of the matching.

Image Training: -Image training part is the most important part, since by training the image the system can be able to use the template for detecting the defect. It is with the use of the image training method the samples are matched with the template that is generated.
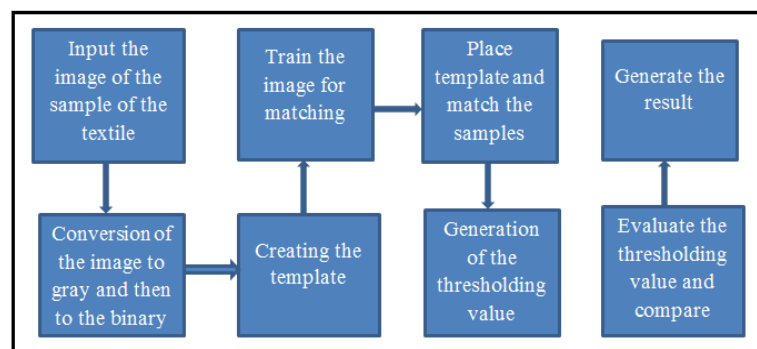

Figure 1: Design of the System

Pattern Matching:- It is the process in which the templates are been matched with the given sample images of the yarned fabrics,mainly for the defects. Defined algorithm processes the samples and compared with templates and behaves exactly like the parser lyk scanning string by string,here block by block without missing any of the space in the sample image. Pattern matching also makes use of the background data provided for finding the solution to the proposed system.

Threshold Value:- Threshold value is generated after matching the templates with the sample image for very single part. Threshold values given by the previous stage are processed , analysed and given conclusion for the defects in the way that if current value is less than the threshold value then it indicates the defect otherwise evrything is fine.

Evaluation of the Threshold Value:- Threshold value generated in the previous stage is being evaluated for the defects in this block. Analysis of the threshold values generated is an important aspect since thevalues are checked if all he values are same then the defect is pointed and if any of the value is changed or is different from all the values then there is no defect in the textile and it is done ok, proceeded to the next stage.

Generating the Results:- Results are generated according to the output of the previous stage. If the values change defect or else no defect.

Implementation part is done in the MATLABbecause of its distinguishing features of merging pattern recognition or matching with it varied inbuilt mathematical calculation and the feature of matrix multiplication. The input to the system been the images analysing on the images can be done very consistently and easily.

RESULTS

Results of the system can be distinguished in two types one with indicating the faults and one which indicate the normal image. It is divided in to the three stages

Loading the template that implies the creation of the template from the sample image

Loading the target that implies the selection of the sample image or passing the input sample

A two phase processing is done one in which the threshold values are generated

Another that indicates the number of faults are shown along with the position of the fault.
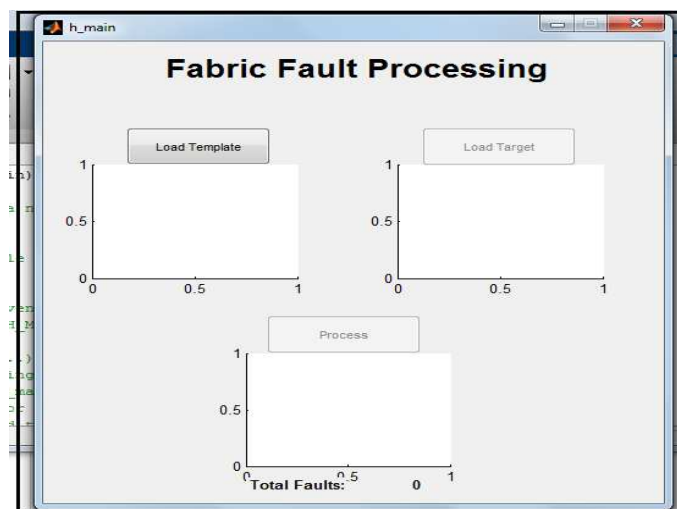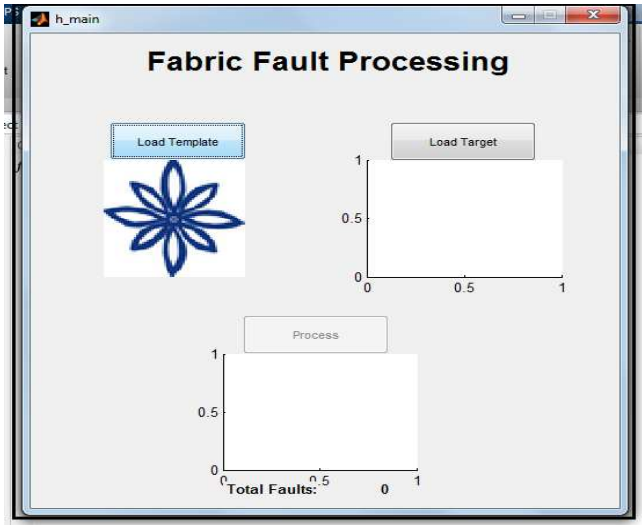

Figure 2: Home Screen of the System

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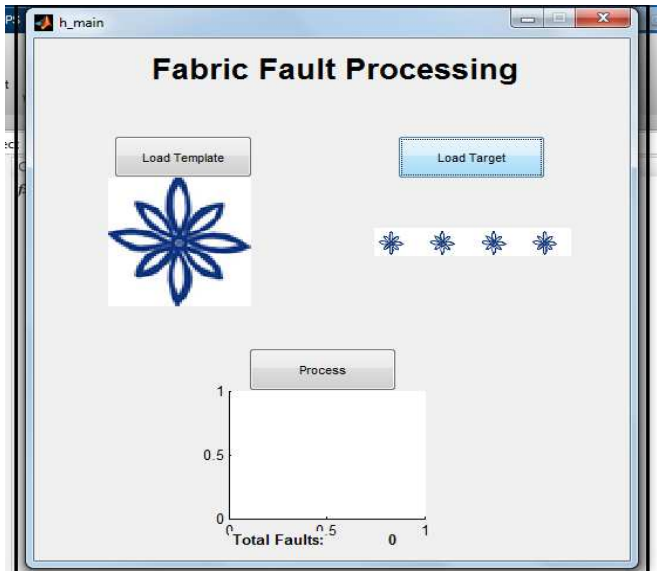**Figure 3: Template Loaded in to the System**

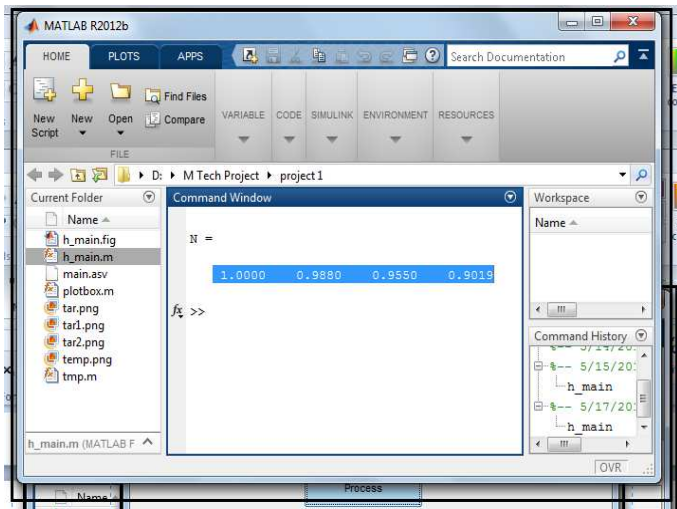**Figure 4: Passing the Input Sample to the System**

Figure 5: Threshold Value Generated for Each and Every Templates in the Samples
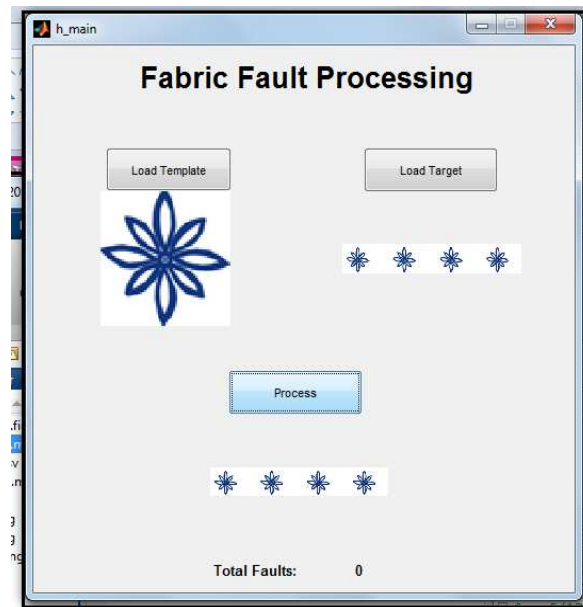
**Figure 6: Processing Which Shows the Number of Faults.
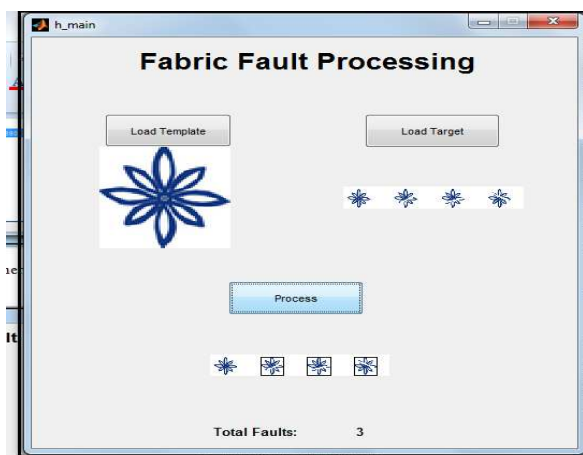Here the Sample Do Not Have Fault and Hence Faults=0**

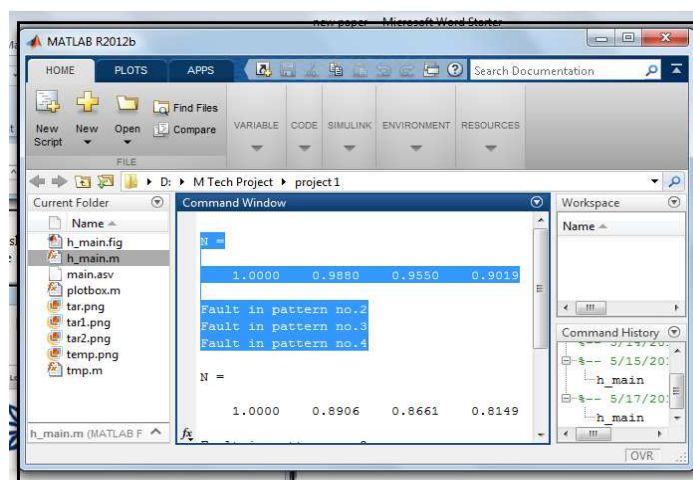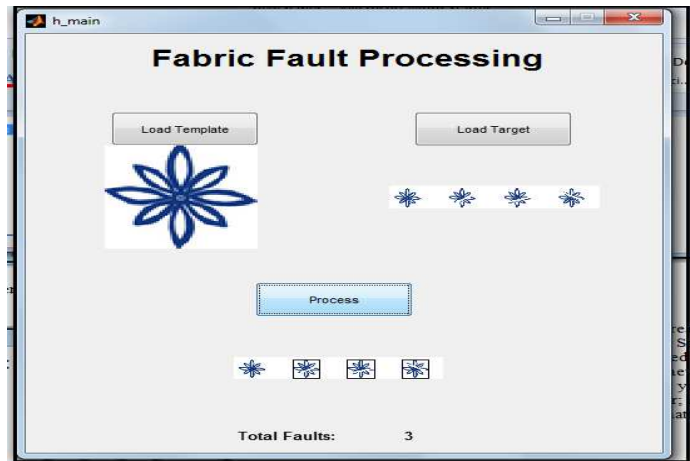**Figure 7: Defective Sample Loaded in to the System**

**Figure 8: Threshold Value Generated for Each and Every Template in the Samples and the
Template No. 2, 3 and 4 Value is Different and That is Indicating the Position of the Fault**

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Figure 9: Processing Which Shows the Number of Faults.
Here the Sample Have Fault and Hence Faults=3

The above results are shown with two types of samples one with defect and one without defects.

In the sample containing defects the threshold value of the pattern having fault is lower than the set value and hence the defect is highlighted and number of faults are shown.

In the sample without defect all the threshold values are similar and hence the number of faults shown is zero.

ADVANTAGES AND DISADVANTAGES

System benefits the industries by detecting the defects and thus reducing the human labor. By giving the fault free textiles production of the industries increases thus adding to the profit. The system also gives the advantages in the domain of the cost saving such that the human labor will be replaced.

Limitations also exists in the system since efficiency in the output of the system may vary or sometimes it may be of no use to the reason that the samples are in the form of the images that are given as the input to the system.

CONCLUSIONS

Thus we come to the conclusion that the defects in the fabrics can be detected to the max of 90%.the reason behind the efficiency is that the generation of the threshold values and the comparison of those threshold values for getting the proper results. Out of all the implementation techniques used so far for the detection of the faults in the textile this system proved to be more efficient. The unseen or missed out faults caused due to the human behavior is solved out in the system.

Controversy if seen system proves to be less useful as it is been working only for the images and not for the actual fabrics that in turn increases the hardware cost for mounting the camera and the other aspects regarding the components of the system. Considering this particular limitation of the system can be merged with either of the neural network or the microcontroller combination for much better output. MATLAB been the readymade technique is easily available and many functions can be efficiently used only because of the image processing background.

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